Claims

What is claimed is:

1. An electrical connector, comprising:

an elongated conductive body defining a central axis and having an end;

an electrically conductive annular portion at said end concentric to said central axis;

an electrically conductive frustoconical portion extending inward from said annular portion toward said central axis; and

an electrically conductive planar portion below said annular portion, concentric to said central axis, and coupled to said frustoconical portion.

2. The electrical connector in claim 1, wherein said body comprises a pogo pin.

3. A socket contact head, comprising:

a flat area;

a sidewall extending upward and outward from said flat area; and

a perimeter portion extending outward from said sidewall; wherein a selection of said flat area, said sidewall, said perimeter portion, and combinations thereof is configured to receive an IC chip contact and further configured to transmit an electrical signal along a socket contact body.

4. The socket contact head of 3, wherein said sidewall comprises a plurality of planar walls.

5. The socket contact head of claim 4, wherein said sidewall comprises:

a first planar wall;

a second planar wall coupled to said first planar wall; and

a third planar wall coupled to said first planar wall and said second planar wall.

6. An electrically conductive contact head, comprising:

an upper portion defining an opening;

a sidewall coupled to said upper portion at a first transition area and declinningly converging from said first transition area;

a lower portion coupled to said sidewall at a second transition area; and

an electrical connection contact area at a selection of said upper portion, said sidewall, said lower portion, and combinations thereof;

wherein a selection of said upper portion, said sidewall, said lower portion, and combinations thereof is configured to contact a socket contact body.

7. The electrically conductive contact head in claim 6, wherein said electrical connection contact area defines a circle along said sidewall.

8. The electrically conductive contact head in claim 6, wherein said electrical connection contact area defines a plurality of points along said sidewall.

9. The electrically conductive contact head in claim 6, wherein said electrical connection contact area comprises:

at least a circle along said sidewall; and

at least a point on said lower portion.

10. The electrically conductive contact head in claim 6, wherein said electrical connection contact area coincides with at least a portion of said upper portion.

11. The electrically conductive contact head in claim 6, wherein said electrical connection contact area coincides with said first transition area.

12. The electrically conductive contact head in claim 11, wherein said first transition area is rounded.

13. A receptacle for an IC chip contact, comprising:

a metal layer having a shape that is at least generally complimentary to said IC chip contact, wherein said layer comprises:

an outer surface,

a curved middle surface transitioning from said outer surface, and

a curved inner surface transitioning from said middle surface; and

a conductive material in electrical communication with said metal layer and extending generally unidirectionally from said metal layer.

14. The receptacle in claim 13, wherein said outer surface comprises a curved surface.

15. An electrical connection device, comprising:

a head defining an inner frustum-shaped recess and sized to accommodate an IC chip contact; and

a resilient body coupled to said head.

16. The electrical connection device of claim 15, wherein said resilient body comprises:

a doped semiconductor shaft; and

an elastomer material contacting said shaft.

17. The electrical connection device of claim 15, wherein said resilient body comprises a compressible metallic element.

18. The electrical connection device of claim 17, wherein said resilient body comprises a tube defining at least one aperture therein.

19. The electrical connection device of claim 17, wherein said resilient body comprises:

a spring coupled to said head; and

a shaft coupled to said spring.

20. The electrical connection device of claim 19, wherein said resilient body further comprises a shell coupled to said head and outwardly concentric to said shaft.

21. A pin for a socket, comprising:

a head having a central recess; and

a shaft in electrical communication with said head and biased from said head, wherein said shaft is configured to extend from said socket.

22. The pin in claim 21, further comprising a spring coupled to and interposed between said head and said shaft.

23. The pin in claim 22, wherein said spring defines a plurality of coil circumferences.

24. The pin in claim 23, wherein said spring comprises:

a first section next to said head and defining a first coil circumference;

a second section next to said first section and defining a second coil circumference; and

a third section between said second section and said shaft and defining a third coil circumference generally equal to said first coil circumference.

25. The pin in claim 24 wherein said second coil circumference is greater than said first coil circumference.

26. The pin in claim 25, wherein said second section of said spring is configured to contact a nonconductive portion of said socket.

27. A socket connector comprising:

a cup-shaped head; and

a resilient tube next to said head and defining at least one aperture in said tube, wherein said tube is configured to at least partially extend into a socket hole.

28. The socket connector in claim 27, wherein said tube defines a plurality of apertures at one length along said tube.

29. The socket connector in claim 27, wherein said tube defines a first aperture at a first length along said tube; and a second aperture at a second length along said tube.

30. The socket connector in claim 27, wherein said tube defines a first aperture on a first side of said tube and a second aperture on a second side of said tube.

31. The socket connector of claim 30, wherein said head is integral to said tube.

32. A contact, comprising:

a metal body sized to partially fit within an IC chip socket, wherein said metal body defines:

a generally continuous profile; and

at least one deformation of said profile.

33. The contact in claim 32, wherein said generally continuous profile comprises a cylindrical profile; and wherein said deformation comprises a rectangular slit.

34. The contact in claim 32, wherein said deformation comprises a semi-circular aperture.

35. An electrical connector, comprising:

a socket contact head configured to receive an IC chip contact; and

a socket contact body coupled to said head and comprising:

a first portion,

at least one strip integrally extending from said first portion, and

a second portion integrally extending from said at least one strip.

36. The electrical connector in claim 35, wherein said first portion and said second portion are hollow.

37. The electrical connector in claim 36, wherein said first portion and said second portion are cylindrical and define a common central axis.

38. The electrical connector in claim 37, wherein said at least one strip is bent toward said central axis.

39. The electrical connector in claim 37, wherein said at least one strip is configured to bend toward said central axis in response to a compressive force along said central axis.

40. A method of processing an array of contacts, comprising:

defining a general shape for each contact of a plurality of contacts;

maintaining a position of said each contact relative to other contacts in said plurality;

singulating said plurality of contacts; and

attaching said plurality of contacts to a substrate.

41. The method in claim 40, wherein said step of defining a general shape for each contact of a plurality of contacts comprises:

providing a semiconductor substrate having a top and a bottom;

etching said top of said substrate; and

etching said bottom of said substrate.

42. The method in claim 41, wherein said step of defining a general shape for each contact of a plurality of contacts further comprises a step of defining a sidewall for said each contact.

43. The method in claim 42 wherein said step of defining a sidewall for said each contact comprises sawing around a location defining said each contact.

44. The method in claim 42, wherein said step of defining a sidewall for each contact comprises etching around a location defining said each contact.

45. A method of forming socket contacts, comprising:

forming a plurality of interconnected silicon contacts;

applying an alignment-preserving material to said plurality of interconnected silicon contacts; and

disconnecting said plurality of interconnected silicon contacts.

46. The method in claim 45, wherein:

said step of forming a plurality of interconnected silicon contacts comprises:

etching two silicon contacts from a silicon substrate, and

retaining a portion of silicon between said two silicon contacts; and

said step of disconnecting said plurality of interconnected silicon contacts comprises removing said portion of silicon.

47. The method in claim 46, wherein said step of applying an alignment-preserving material comprises a selection of:

applying a z-axis elastomer on a first side of said plurality of interconnected silicon contacts; and

applying an insulator on a second side of said plurality of interconnected silicon contacts.

48. A method of forming an electrical contact, comprising:
providing a planar silicon substrate;
forming an electrical contact surface from said substrate;
depositing a metallic layer over said surface;
patterning a contact head from said metallic layer; and
forming a discrete electrical contact body from said substrate.

49. The method in claim 48, wherein said step of forming an electrical contact surface comprises:
anisotropically etching a cavity from said substrate; and
protecting a first portion of said substrate from said etching.

50. The method in claim 49, wherein said step of forming an electrical contact surface further comprises retaining a planar second portion of said substrate under said cavity.

51. The method in claim 50, wherein said step of patterning a contact head from said metallic layer comprises:
protecting a section of said metallic layer overlying said first portion of said substrate, an anisotropically etched portion of said substrate, and said second portion of said substrate with an etch resistant material; and
etching an unprotected section of said metallic layer.

52. A socket contact formation process, comprising:
forming a contact head from a conductive material;
forming a contact body from semiconductive material; and
joining said contact head and said contact body.

53. The process in claim 52, wherein:

said step of forming a contact head comprises stamping a metal element;

said step of forming a contact body comprises etching silicon; and

said step of joining said contact head and said contact body further comprises adhering said contact head onto said contact body.

54. The process in claim 52, wherein said step of joining said contact head and said contact body further comprises depositing a metal over a silicon surface.

55. A method of forming a socket, comprising:

providing a semiconductor substrate;

defining an arrangement of a plurality of socket contacts from said substrate;

preserving said arrangement;

providing a substrate having a plurality of conductive leads; and

attaching said plurality of socket contacts to said substrate, wherein at least one socket contact is over at least one conductive lead.

56. The method in claim 55, wherein said step of attaching said plurality of socket contacts to said substrate comprises attaching said plurality of socket contacts to said substrate with a conductive elastomer.

57. The method in claim 56, wherein said step of attaching said plurality of socket contacts to said substrate with a conductive elastomer comprises:

placing said elastomer onto said substrate; and

placing said plurality of socket contacts onto said elastomer.

58. The method in claim 56, wherein said step of attaching said plurality of socket contacts to said substrate with a conductive elastomer comprises:

placing said elastomer onto an underside of said plurality of socket contacts; and

placing said substrate onto an underside of said elastomer.

59. The method in claim 58, wherein said step of preserving said arrangement comprises preserving said arrangement with said elastomer.

60. A method of enabling electrical communication between an IC chip and a printed circuit board, comprising:

defining a deformation within a metal tube;

interposing said metal tube between said IC chip and said printed circuit board;

and at least partially closing said deformation in response to compression applied to a longitudinal axis of said metal tube.

61. The method in claim 60, further comprising:

inserting said IC chip into a socket;

including said metal tube as part of said socket; and

inserting said socket into said printed circuit board.

62. A method of supporting electrical communication through a socket between an IC chip and a printed circuit board, comprising:

interposing a semiconductive shaft between said IC chip and said printed circuit board;

connecting said shaft to said printed circuit board with an adhesive material; and

allowing electrical conductivity through said adhesive material in response to a compression between said shaft and said printed circuit board.